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// Kevin E. Kuehn Reg. No. 51,904 August 10, 2009
Date

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No.:	10/554,081
Applicant:	Wang, Wenhao
Art Unit:	1797
Examiner:	Po, Ming Cheung
Title:	Nano-Granule Fuel Oil And Its Preparation
Attorney Docket:	KINW-01
Confirmation No.:	4483

August 10, 2009

Mail Stop Amendment
Commissioner of Patents
P. O. Box 1450
Alexandria, VA 22313-1450

DECLARATION OF MR. YUWEN HUANG PURSUANT TO 37 CFR §1.132

I, Yuwen Huang, declare as follows:

1. I am a senior engineer.

2. I am not an inventor of the invention claimed in the present Application.

3. I do not have any interest in any business of the inventor nor do I have any financial interest in the present Application. I have had personal connections with the inventor for some years.

4. I received my Bachelor of Science Degree in Chemical Engineering from Tianjin University, Tianjin, China.

5. I have in excess of 20 years of experience with research and testing in the field of engines and fuels.

6. I have studied U.S. Application Serial No. 10/554,081, (the '081 application), which is entitled "Nano-granule fuel and its preparation," and I understand the invention.

7. Based on the description in the '081 application and my knowledge about fuels and associated devices, I could make and use the device described and shown in the '081 application, so as to treat fuels as described in the '081 application.

8. I have read the outstanding Office Action mailed June 10, 2009, and I understand the Patent Office's stated position.

9. I understand that the Office Action of the USPTO rejects claims 9-12, which are directed to a method for preparing a fuel oil, because the USPTO believes that the usefulness or utility of these claims is not sufficiently established by the specification.

10. I understand that the Office Action also rejects claims 9-12, because the USPTO believes the asserted utility, as asserted in the specification, is not credible.

11. I disagree with the conclusions in the Office Action. In my opinion, the claimed method is useful for treating fuels used in combustion. For example, as recited in these claims, fuels used to power internal combustion engines may be treated with the claimed method. In my opinion, fuels treated accordingly exhibit improved properties over prior art fuels, and the specification is credible in asserting this conclusion.

12. I understand Small Angle Neutron Scattering (SANS). This analytical technique provides data that may be used to measure the sizes of molecular clusters in fuel oil.

13. The data plotted in Fig.3 is consistent with data provided by SANS. In fact, the data plotted in Fig.3 and the related analysis were provided by Center for Neutron Research, National Institute of Standards and Technology (NIST), USA, which is, in my opinion, the best neutron scattering laboratory in the world.

14. Referring to Fig.3, the SANS measurements for the untreated fuel oil is depicted with open circles labeled DI. The measurements indicate that the average molecular cluster size is outside the scale of Fig. 3. In other words, while the exact size of the molecular clusters for the untreated fuel is not exactly shown, the SANS measurements demonstrate that the molecular clusters in the untreated fuel oil are larger than about 310 nm.

15. I have calculated the upper size limit for Fig. 3 as follows. According to the specification, the lower limit of the scattering wave vector, Q, is 0.008 nm^{-1}. Therefore, the corresponding upper limit of the radius of gyration is about 120 nm (1/0.008). The radius of gyration (R_g) is a geometric average distance for spherical approximation, which is most suitable for liquids. The relationship between R_g and the real radius R is as follows:

$$R_g^2 = \frac{2\pi \int_0^{\pi} d\phi sin\phi \int_0^R r^2 dr r^2}{2\pi \int_0^{\pi} d\phi sin\phi \int_0^R r^2 dr} = \frac{3}{5}R^2 \qquad (1)$$

The spherical diameter is twice the real radius R. Therefore, the upper limit of the spherical diameter is $120 \times \sqrt{\frac{5}{3}} \times 2 = 310$ nm. My calculation is consistent with the quantities provided in the '081 application.

16. The SANS measurements for two different treated fuel oil samples is also plotted in Fig. 3. The treated fuel oil samples are labeled D4A and D4B. The SANS data is evidence that the samples D4A and D4B contain molecular clusters that are different in size from the untreated sample DI. This is evidenced by the separation between the DI (open circles) and D4A (filled squares) and D4B (open triangles), most noticeably at low Q values.

17. In my opinion, the claimed treatment method reduced the molecular cluster size from the untreated fuel oil sample, DI, to the molecular cluster size evidence by the SANS measurements for D4A and D4B.

18. I agree with the "Conclusions" set forth on page 9 of the '081 application where the inventor concludes that no granules larger than 3 nm are detected in the treated fuel oil samples.

19. I have studied CN ZL94113646.9 to Wenhao ("Wenhao '646.9") and U.S. Patent No.

5,985,153 to Dolan et al. ("Dolan '153"), a combination of which the Office Action cites for the stated obvious rejections of claims 1-10 and 12-15.

20. I disagree that a combination of Wenhao '646.9 and Dolan '153 renders claims 1-10 and 12-15 obvious as explained below.

21. Wenhao '646.9 describes a method and device for treating fuel. Wenhao '646.9 is described in the '081 application on page 2. Wenhao '646.9 describes a device that may include two permanent magnets in opposing relation. The magnets have diameters and heights in the range of 6 mm to 80 mm. A gap between the magnets is 0.5 to 2.0 mm. Fuel flows through the gap. The coercive force of each magnet is 18,000 to 20,000 oersteds. The magnetic field intensity of the N-pole face is in the range of from 4,000 to 5,200 Gauss.

22. Wenhao '646.9 does not describe the magnetic field gradient between the two magnets. Based on the coercive force, magnetic field intensity, orientation of the magnets, and the disclosure in Wenhao '646.9, Wenhao '646.9 does not suggest modification of the magnetic field gradient and specifically does not suggest a magnetic field gradient of at least 1.5 Tesla/cm.

23. Dolan '153 describes a high internal gradient magnetic capture structure for use with removing magnetically labeled target entities from a fluid medium. In particular, Dolan '153 describes increasing the field gradient to improve separation of magnetically responsive particles.

24. Dolan '153 does not describe any effects of a magnetic field or a magnetic field gradient on the properties of a fuel.

25. Unlike Dolan '153, the opposing, permanent magnets in the '081 application are not used to remove magnetic particles from the fuel. In fact, a separate magnetic filter cavity is described in the '081 application for removing any magnetic particles from the fuel. The effects of the device of the '081 application cannot be attributed to removing impurities when the following factors are taken into account.

1) The SANS test is not sensitive to impurities.

2) There is no significant amount of magnetic impurities in the conventional

fuel as used in Example 4 of the '081 application.

3) There is no meaningful room or outlet in the device for a significant amount of impurities. This is particularly evident when the large amount of fuel that must pass continuously through the device of the '081 application, as demonstrated by the test described in Example 6, is taken into account.

26. The Office Action provides that a smaller gap would produce a stronger field. I disagree. As stated in Dolan '153, when two bar magnets are positioned in opposition to one another, the number of field lines remains the same, but they become compressed. Actually, as the gap between the magnets is reduced, the magnetic field becomes more inhomogeneous and the gradient of the magnetic field increases significantly.

29. Therefore, in my opinion, neither of Wenhao '646.9 nor Dolan '153 suggest reducing the gap to less than 0.5 mm and increasing the magnetic field gradient to at least 1.5 Tesla/cm for treating fuels.

30. In my opinion, one of ordinary skill in the art would not combine Wenhao '646.9 with Dolan '153 to arrive at the claimed invention.

31. I have been warned that any materially false, fictitious or fraudulent statement or representation may be punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that any such statement or representation may jeopardize the validity of this document. I declare that I am properly authorized to execute this document, that all statements made of my own knowledge are true, and that all statements made on information and belief are believed to be true.

8.10.2009
Date

Yuwen Huang
Yuwen Huang